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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,549	08/02/2003	Marcos Kamezos	CPAC 1017-2	2569

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EXAMINER

CAO, PHAT X

ART UNIT PAPER NUMBER

2814

DATE MAILED: 10/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/632,549	KARNEZOS, MARCOS	
	Examiner	Art Unit	
	Phat X. Cao	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 11-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/2004, 4/2004, 8/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I, claims 1-10 in the reply filed on 8/3/04 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Mori (US. 5,903,049).

Regarding claim 1, Mori (Fig. 1) discloses a multi-package module comprising stacked lower and upper packages 6b and 6a, each the package including a die 1a/1b attached to a substrate 2a/2b (column 2, lines 41-47), wherein the upper and lower substrates 2a/2b are interconnected by wire bonding 7 (see the rightmost wire 7).

Regarding claims 6-7, Mori's Fig. 1 further discloses that the package is a land grid array package and has flip chip interconnect of the die 1a/1b with the substrate 2a/2b.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1-2, 5-7 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Kikuma et al (US. 6,777,799).

Regarding claims 1-2, Kikuma (Fig. 10) discloses a multi-package module comprising stacked lower and upper packages, the lower package including a die 72 attached to a substrate 26 and the upper package including a die 74 attached to a substrate 76, wherein the upper substrate 76 and the lower substrate 26 are interconnected by wire bonding 84 and wherein at least one of the package has wire bond 82/86 interconnect of the die 74/72 with the substrate 76/26.

Regarding claims 5-6, Kikuma's Fig. 10 further discloses that the upper package is a land grid array package and the lower package is a ball grid array package.

Regarding claim 7, Kikuma (Fig. 17B) discloses a multi-package module comprised stacked lower and upper packages, the lower package including a die 72 attached to a substrate 26 and the upper package including a die 74 attached to a

substrate 76, wherein the upper substrate 76 and lower substrate 26 are interconnected by wire bonding 86 and wherein each package has flip chip interconnect of the die 74/72 with the substrate 76/26 by the solder bumps.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2-3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori (US. 5,903,049) in view of Applicant's admitted prior art.

Regarding claims 2-3, Mori (Fig. 1) further discloses that the package 6a/6b is fully encapsulated. Mori does not disclose that the package 6a/6b has wire bond interconnect of the die with the substrate.

However, Applicant's admitted prior art (Figs. 2 and 3) teaches the forming of a multi-package module comprising stacked lower and upper packages, each package has wire bond interconnect of the die with the substrate (Fig. 2) or has flip chip interconnect of the die with the substrate (Fig. 3). Accordingly, it would have been obvious to form the stacked lower and upper packages of Mori by either flip chip bonding or wire bonding because as taught by Applicant's admitted prior art, such bonding structures are well known for providing the electrical connection from the die to the package substrate.

Regarding claim 10, it would have been obvious to add a third stacked package to a multi-package structure of Mori because the number of the packages can be varied depending upon the application, which is required for a multi-package module.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of Applicant's admitted prior art and Lobianco et al (US. 6,340,846).

As discussed in details above, the combination of Mori and Applicant's admitted prior art substantially reads on the above claim, including the package having wire bond interconnect of the die with the substrate.

The above combination does not disclose that the package is encapsulated only to an extend.

However, Lobianco (Fig. 6) teaches a package has wire bond 38 interconnect of the die with the substrate 20 and wherein the package is encapsulated by the adhesive 64 only to an extend. Accordingly, it would have been obvious to fully encapsulated or only partially encapsulate the package of the above combination because as taught by Lobianco, both encapsulations would provide the same results of protecting the wire bonds between the die and the substrate (column 5, lines 39-44).

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mori (US. 5,903,049) in view of Barrow (US. 5,898,219).

Mori does not disclose a heat spreader.

However, Barrow (Fig. 1) teaches the forming of a heat spreader 40 on a top surface of the package. Accordingly, it would have been obvious to form a heat spreader on a top surface of the multi-package module of Mori because as taught by

Barrow, such heat spreader would provide a thermal path, which can efficiently remove heat from the package module (column 2, lines 46-54).

10. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori (US. 5,903,049) in view of Hoffman et al (US. 6,737,750).

Regarding claim 8, Mori does not disclose a heat spreader.

However, Hoffman (Fig. 1) teaches a stacked semiconductor packages having a heat spreader 14 (column 4, lines 50-52) formed on a top surface of a lower die 12a. Accordingly, it would have been obvious to form a heat spreader on a top surface of the lower package of Mori because as taught by Hoffman, such heat spreader would provide a thermal path, which can efficiently remove heat from the package module (column 4, lines 50-52).

Regarding claim 9, the heat spreader 14 of Hoffman is inherently functioning as an electromagnetic shield because it is connected to a ground potential (column 6, lines 45-47).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phat X. Cao whose telephone number is (571) 272-1703. The examiner can normally be reached on Monday - Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PC
September 25, 2004


PHAT X. CAO
PRIMARY EXAMINER